REMARKS

Claim 15 has been amended. Claims 1-27 are pending and under consideration in the application.

Prior Art Rejections

Claims 15, 16, 18-23, 25 and 26 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Richard et al. (U.S. Patent No. 6,470,955) in view of Adachi et al. (U.S. Patent No. 6,769,473). The rejection was based on the belief that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Richard et al. casting method by "ceasing agitating the slurry and transferring agitated semi-solid into a cooling vessel as taught by Adachi et al. in order to effectively control cooling the semi-solid and obtain a targeted solid content in the semi-solid."

The claims are patentable over Richard et al. in view of Adachi et al. because the processes described by Richard et al. and Adachi et al. are incompatible. The Richard et al. process involves the creation of "a sustainable homogeneous, isothermal, semi-solid metal bath 16 contained in reservoir 30 from which casting charges may be withdrawn as needed." This is achieved in accordance with the teachings of Richard et al. by employing "Constant agitation of semi-solid metal bath 16 and rapid replacement of removed semi-solid metal 34 with molten metal 32 slightly above the liquidation temperature." (Column 9, lines 32-37.) Thus, the essence of the Richard et al. process involves the use of constant agitation and rapid replacement of removed semi-solid metal to create a sustainable homogeneous, isothermal, semi-solid metal bath in a reservoir from which casting charges may be withdrawn as needed. Ceasing agitation would be contradictory to the invention of Richard et al. It is never obvious to modify a reference so as to eliminate the essential features of the invention.

The claims are also patentable over the combination of Richard et al. in view of Adachi et al. because the Adachi et al. patent does not teach ceasing mechanical agitation. The claims require insertion of an agitator into a liquid metal alloy composition contained in a holding vessel and agitating the liquid metal alloy composition in the holding vessel with the agitator while cooling the liquid metal alloy composition, and finally ceasing agitation and removing

the agitator from a semi-solid slurry. Adachi et al. do not teach or suggest agitating a liquid metal alloy composition with an agitator, but instead expressly teach against reliance "upon the conventional mechanical or electromagnetic agitation." (See the abstract.) Adachi et al. have stated, "In the invention method, the dendritic primary crystals that have been crystallized within a temperature range for the semisolid state are not ground into spherical grains by mechanical or electromagnetic agitation as in the prior art but the large number of primary crystals that have been crystallized and grown from the introduced crystal nuclei with the decreasing temperature in the range for the semi-solid state are spheroidized continuously by the heat of the alloy itself (with may optionally be supplied with external heat and held at a desired temperature)." (See column 18, line 63 through column 19, line 11.) A reference that does not teach, but instead teaches against, agitation using an agitator, cannot possibly teach the concept of ceasing agitation, and therefore cannot provide any suggestion or motivation for ceasing the continuous agitation required and essential to the invention described in the Richard et al. patent.

The claims are patentable over the combination of Richard et al. in view of Adachi et al. because neither reference provides any suggestion for achieving a low solids content in a first vessel while agitating the metal and transferring the slurry to a second vessel and cooling the slurry without agitation to achieve a higher solids content. To the contrary, the Richard et al. patent is devoted to the concept of maintaining a constant, homogeneous, isothermal semi-solid slurry. Thus, Richard et al. are maintaining a constant solids content in a bath until the semi-solid metal is transferred to a die casting machine. In other words, there is not any teaching or suggestion in the Richard et al. patent for cooling without agitation in a second vessel to raise the solids content prior to forming and shaping the material into a desired metal component. The Adachi et al. patent also fails to teach the concept of achieving a first solids content in an agitated vessel before transferring the low solids content slurry into a second vessel for cooling without agitation to achieve a higher solids content. To the contrary, Adachi et al. disclose a first vessel 10 containing a liquid metal (zero percent solids). The metal (M) is transferred to a second vessel 30 (see Fig. 60) via a jig 20. Nucleation and crystal growth

begins when the metal (M) contacts jig 20, and continues without agitation in vessel 30. Thus, the applied references do not teach or suggest the concept of forming a semi-solid slurry having a low solids content in a first agitated vessel, and raising the solids content in a second vessel without agitation before transferring the metal to a shaping apparatus.

In view of the above considerations, it is respectfully submitted that the claims are patentable over the combination of Richard et al. in view of Adachi et al.

Claims 1-14, 17 and 24 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Richard et al. in view of Adachi et al. and further in view of Otaki et al. (U.S. Patent No. 6,607,578).

Claims 1-8, 17 and 24 are allowable for the reasons generally set forth above. The combination of Richard et al. and Adachi et al. are incompatible (the essence of the Richard et al. process is to utilize continuous agitation to maintain a homogeneous isothermal semi-solid metal slurry bath, whereas the essence of the Adachi et al. process is to avoid mechanical agitation). Further, neither reference teaches or suggests ceasing mechanical agitation, and neither reference teaches or suggests forming a low solids content slurry in a first vessel and a higher solids content slurry in a second vessel before transferring the slurry to forming and shaping apparatus.

To any extent that the above arguments do not apply to claims 9-14, it is believed that the Otaki et al. patent does not teach or suggest the use of a graphite agitator for inducing convection while rapidly cooling a metal composition to initiate solidification and forming of non-dendritic solid particles. In this regard, it should be noted that the Otaki et al. patent only discloses that "at least the inner wall face of the molten liquid stirring part B is made of a material having poor wettability with the molten metal (for example graphite)." (See column 6, lines 63-67.) This does not appear to suggest an entire agitator that is graphite in order to achieve rapid cooling. Further, none of the applied references teach a non-wetting or reduced wetting coating (claim 13) or a boron nitride coating (claim 14).

Claim 27 has not been rejected, or at least the basis for any rejection of claim 27 has not been stated. Clarification is requested.

CONCLUSION

In view of the above amendments and remarks, it is respectfully submitted that the application is in condition for allowance and notice of the same is earnestly solicited.

Respectfully submitted,

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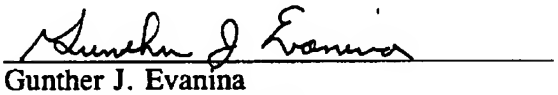

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